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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/519,599	03/06/2000	Kazuo Maeda	OKA-B914	8776

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EXAMINER

QUACH, TUAN N

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 12/04/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/519,599

Applicant(s)

MAEDA, KAZUO

Examiner

Tuan Quach

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 October 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) 28-39 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 14-27 is/are allowed.
- 6) ☒ Claim(s) 1-8 and 13 is/are rejected.
- 7) ☒ Claim(s) 9-12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2, 4, 5
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Applicant's election with traverse of claims 1-27 in Paper No. 7 is acknowledged.

The traversal is on the ground(s) that it is an impossibility to form the product by a process wherein annealing of the interlayer insulator is simultaneous with or prior to the formation of the insulator. This is not found persuasive because of the reasons below.

Initially, applicant's argument presumes that by virtue of reciting the process claim, it is impossible to make the product claim without performing the process claims. It remains that the non-elected device claims claiming a semiconductor device thus correspond to product claims; it is well settled that it is the patentability of the product which must be determined, and not of the recited process steps. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed Cir. 1985), *In re Brown*, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972). It thus remains that although product-by-process claims, e.g., claims 33-35, recite the annealing step of the insulator by referencing back to the process claim, it is the patentability of the product and not of the process which must be determined. It remains that the product as claimed in these claims, e.g., the product of the interlayer insulating layer can be obtained by alternative processes wherein the annealing of the interlayer insulator is effected simultaneous with or prior to the deposition, wherein the substrate is heated prior to deposition, or alternatively without annealing. Applicant has not provided with any concrete evidence that an unobvious difference in the product would result from such process. Alternatively, the process as claimed can be used to make a materially different product such as a passivation layer or a support layer rather than an interlayer insulator. Similarly, although product claims

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36-38 though reciting product formed by apparatus (presumably by the alleged process), it is the patentability of the product, and not of the apparatus or process which must be determined. The product can also be formed in a different apparatus, e.g., a multichamber including an annealer. Alternatively, the apparatus as claimed can be used to make a different product, e.g., to form a passivation layer or a support layer rather than an interlayer insulator.

The requirement is still deemed proper and is therefore made FINAL.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-8 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vines et al. taken with Kapoor.

Vines et al. teach forming interlayer insulator by plasma-enhanced CVD including use source gas including Si-C-O-H compound and oxidative gas, e.g., H₂O, including inert gas therein to form TEOS and annealing of the layer to eliminate water or other impurities in the dielectric layer, including oxidation anneal including in oxygen containing ambient. See the abstract, column 1 line 13-16, column 2 lines 1-40, line 52 to column 3 line 67, column 4 lines 20-40, lines 50-59.

Vines et al. lack primarily the teachings of incorporating the boron containing.

Kapoor teaches forming insulator for integrated circuit structure comprising the dielectric layer comprising boron to reduce flow temperature. The annealing of the

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dielectric an a composite layer to anneal is also to form a porous dielectric layer by treatment in oxygen whereby the carbon is released and whereby porous layer is obtained. Subsequent provision of capping layer is also shown. See column 4 lines 20 to column 6 line 11, lines 20-45, Fig. 2-4, column 7 lines 29-39.

It would have been obvious to one skilled in the art in practicing the Vines et al. process to have incorporated in Vines et al. process the inclusion of boron in the dielectric layer to obtain reduced flow temperature and to have effected the annealing such that carbon is released and porous film obtained as suggested by Kapoor et al. to obtain porous layer having impurities, water, carbon, etc., released from the film. The inclusion of capping layer is well known in the art as shown in Kapoor and as such would have been obvious. The use of alternative oxidative gas including oxygen is well known in the art and such substitution of one well known oxidative gas for another would have been obvious. The use of Ar as inert gas is well known in the art and such use would have been obvious. Oxygen plasma is a well known reactive source of oxygen to enhance reactivity is well known in the art and thus would have been obvious to one skilled in the art.

Claims 9-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 14-27 are allowed.

The prior art of record do not teach or suggest the further limitations in claims 9-12 and do not teach the claimed process in claim 14, hence 15-27.

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As allowable subject matter has been indicated, applicant's reply must either comply with all formal requirements or specifically traverse each requirement not complied with. See 37 CFR 1.111(b) and MPEP § 707.07(a).

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Suzuki et al., Iyer, and Hu et al. teach formation of dielectric of interest.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Quach whose telephone number is 703-308-1096. The examiner can normally be reached on M - F from 9 to 5. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



Tuan Quach
Primary Examiner